

CHAPTER 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 INTRODUCTION

The chapter of this environmental assessment (EA) for the proposed Adobe Town 2D seismic project discusses environmental, social, and economic factors as they currently exist within the Adobe Town project area (ATPA). The material presented here has been guided by management issues identified by the Bureau of Land Management (BLM), Rock Springs Field Office.

This proposal could potentially affect critical elements of the human environment as listed in BLM's National Environmental Policy Act (NEPA) Handbook H-1790-1 (USDI-BLM 1988). The critical elements of the human environment, their status in the ATPA and their potential to be affected by the proposed project are listed in Table 3-1.

Table 3-1. Critical Elements of the Human Environment¹, Adobe Town 2D Geophysical Project, Sweetwater County, Wyoming, 2002.

Element	Status on the ATPA	Addressed in text of EA
Air quality	Potentially affected	Yes
Areas of critical environmental concern	None present	No
Cultural resources	Potentially affected	Yes
Environmental justice	None present	No
Prime or unique farmlands	None present	No
Floodplains	None present	No
Native American religious concerns	None present	No
Invasive plants	Potentially affected	Yes
Threatened and endangered species	Potentially affected	Yes
Hazardous or solid wastes	None present	No
Water quality (surface and ground water)	Potentially affected	Yes
Wetlands/riparian zones	None present	No
Wild and scenic rivers	None present	No
Wilderness (study area)	Potentially affected	Yes

¹ As listed in BLM *National Environmental Policy Act Handbook H-1790-1* (BLM 1988b) and subsequent Executive Orders

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In addition to the critical elements, this EA discusses potential effects of the project on geology/paleontology/soils, Adobe Town wild horse herd management area, vegetation, wildlife/special status species, noise, wilderness/visual resources/recreation, and socioeconomic considerations.

This discussion also provides an analysis of impacts and the potential environmental consequences that would result with project implementation. In addition, mitigation measures are provided that were developed in response to impacts described in the discussion of environmental consequences. The measures and requirements describe how seismic exploration operations would be managed to reduce or eliminate impacts to other resource values in the project area.

The No Action Alternative, with implementation, would result in the proposed geophysical project not occurring. Existing land and resource use activities within the project area would continue as is without the effects associated with the Adobe Town 2D seismic project. As a result, there would be no change to the existing environment unless otherwise noted.

The information presented here has been guided by interdisciplinary analysis of the proposed Adobe Town 2D seismic program.

3.1 AIR QUALITY

3.1.1 Affected Environment/No Action Alternative

The project area and general vicinity is in attainment for all the National Ambient Air Quality Standards (NAAQS) and Wyoming Ambient Air Quality Standards (WAAQS). Table 3-2 shows the measured background pollutant concentrations in the region as compared to the NAAQS and WAAQS.

Table 3-2. Measured Background Concentrations in Southwest Wyoming Compared to the National and Wyoming Ambient Air Quality Standards.

Pollutant	Averaging Period	WAAQS (ug/m ³)	NAAQS (ug/m ³)	Monitored Background Concentration (ug/m ³)
NO ₂	Annual	100	100	9
SO ₂	3-hour	1,300	1,300	132
	24-hour	260	365	43
	Annual	60	80	9
PM ₁₀	24-hour	150	150	18
	Annual	50	50	8
PM _{2.5}	24-hour	N/A	65	10
	Annual	N/A	15	5
CO	1-hour	40,000	40,000	3,500
	8-hour	10,000	10,000	1,500
Ozone	8-hour	160	160	130

The air quality in the project area is predominantly good, with low ambient concentrations of

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pollutants. Air pollutants occurring in the area are mainly dust resulting from travel on unsurfaced roads.

The ATPA is classified as a Prevention of Significant Deterioration (PSD) Class II area, which includes areas that may be industrialized with release of certain pollutants within the requirements of State of Wyoming Division of Air Quality's ambient and PSD standards. Annual geometric mean values in the area generally fall well within the Wyoming annual standard of 60 micrograms per cubic meter (Table 3-2). The levels for total suspended particulates are largely due to livestock grazing and wind-blown dust from travel on rural roads and agricultural activities. Concentrations of gaseous pollutants are very low, falling well within the State and Federal standards.

3.1.2 Environmental Consequences

Air quality could be impacted as a result of project operation in the following ways: 1) suspended particulate matter generated from seismic operations (drilling operations) and vehicle travel on unimproved dirt roads, and 2) emissions from seismic equipment, including support vehicles.

The proposed project would have a negligible short-term effect on the quality of the air in the project area and down-wind from the project area. Fugitive dust would be generated by the support vehicles traveling on existing improved and unimproved dirt roads. Fugitive dust would only be generated during times of dry soil. The small number of drilling units and support vehicles used in the seismic project would emit nominal quantities of byproducts of fossil fuel combustion, including NO_x and SO₂. The short duration of geophysical operations combined with good atmospheric circulation would minimize the impacts on air quality. Such impacts are temporary and would not be considered important. No cumulative impacts would occur to air quality with implementation of the proposed seismic program.

3.1.3 Mitigation Summary

Optimizing seismic operations at one time would reduce the amount of fugitive dust generated over the life of the project. No open burning of garbage or refuse should be allowed in association with seismic activities.

3.2 GEOLOGY/FLUID MINERALS /PALEONTOLOGY/SOILS

3.2.1 Affected Environment

Geology/Fluid Minerals

The proposed seismic line lies within the Washakie Basin, the easternmost subbasin of the Greater Green River Basin. The Washakie Basin is a structural basin bounded by mountain or arch uplifts. It is bounded to the east by the Sierra Madre, to the north by the Wamsutter Arch, to the west by the Rock Springs Uplift, and to the south by the Cherokee Ridge. The Washakie Basin began developing as a structural basin about 70 million years ago during the late Cretaceous Period. Its axis trends northeast-southwest and Cretaceous rocks dip inward at approximately 8 degrees along its eastern flank and about 15 degrees along its western flank (Love 1970). During the late Cretaceous and early Tertiary the basin filled with sediments eroded from surrounding highlands and mountains. Cretaceous and Tertiary sedimentary rocks comprise a great thickness in the basin. Depth to Late Cretaceous rocks in the basin central exceeds 16,000 feet and Precambrian basement rocks lie at depths greater than 32,000 feet. Surface elevations in the basin range from about 6,100 to 8,700 feet and average about 7,000 feet.

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Sedimentary deposits of early Tertiary (middle Eocene) age crop out along the proposed seismic line. These deposits, including the Adobe Town Member of the Washakie Formation, consist chiefly of rocks that accumulated in terrestrial environments.

Below the surface of the seismic line is underlain by Phanerozoic sedimentary rocks, with the exception of no Silurian and Ordovician age deposits. These deposits range in age from Quaternary to Cambrian.

Petroleum was first discovered in the Washakie Basin in 1948 in the Wamsutter Field where production was encountered in the Almond Formation (Upper Cretaceous). The 1970s saw the discovery of oil and gas in the Washakie Basin in Cretaceous rocks in several fields (Haystack, McPherson Springs, Triton and Windmill Draw). Additional discoveries were made in the 1980s in the Cedar Breaks, Desert Rose, N.T., Dripping Rock, Rim Unit, and Shallow Creek fields.

Oil and gas production in these fields is derived from upper Cretaceous rocks ranging in depth from slightly more than 9,000 feet to more than 16,000 feet. Producing formations include with increasing age and depth the (1) Lance Formation, (2) Fox Hills Sandstone, (3) Lewis Shale, and (4) Mesaverde Group, including chiefly the Almond Sandstone. The best producers thus far have been lenticular sandstones in the Lewis and Mesaverde Group (including the Almond Sandstone).

Considerable gas reserves may be contained in the deeper parts of the Washakie Basin in tight sands of Cretaceous and early Tertiary age generated from coals and carbonaceous shales in the Fort Union, Lance, and Mesaverde Group and perhaps the Lewis and Cody Shales. At depths greater than 8,000 feet along the basin margin and 10,000 feet in the basin center these rocks are over pressured (McPeck 1981; Surdam, et al.; 1995) with bottom hole pressure gradients in the 0.83 and 0.86 psi/ft for the Mesaverde at Haystack and Adobe Town, and 0.55 to 0.6 psi/ft range in the younger Lance and Fort Union gas pay zones. According to McPeck (1981) there is considerable additional potential for oil and gas reserves in these units deeper in the Washakie Basin because of the abnormally high pressure gradients.

Deeper parts of the eastern Green River Basin (including the Washakie Basin) remain sparsely explored, but sandstones in the Lewis and Almond Formations, as well as younger ones in the overlying Lance and Fort Union Formations, might prove to contain large reserves (>20Tcf) of natural gas. Thermal and maturation modeling (Surdam, et al., 1995) show that Almond Formation shale and coal in the central parts of the basin had generated significant amounts of liquid hydrocarbons by 40 million years ago and that gas generation from oil to gas reaction had progressed significantly by 30 million years ago.

Three oil and gas leases are affected by the action. WYW-017284 was issued January 17, 1969 and covers 1,840 acres. Lease WYW-017282A was issued March 1, 1969 and covers 640 acres. Lease WYW-017296 was issued January 17, 1969 and encompasses 2,547+ acres. All three leases pre-date passage of NEPA and FLPMA which required BLM to consider lands for wilderness designation. Regardless, leases existing on October 21, 1976 are considered as valid existing rights under the IMP. Two other wells, one located in Section 20, T. 15 N., R. 97 W. and one located in Section 30, T. 15 N., R. 97 W., are within the three pre-FLPMA leases affected by the seismic project but have been plugged and abandoned.

Paleontological Resources

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Deposits of the Adobe Town Member of the Washakie Formation (middle Eocene) crop out along the proposed seismic line. This unit is known to yield vertebrate fossils of high scientific interest and for that reason it satisfies BLM Paleontologic Resource Condition 1 (H8270- 1 General Guidance for Paleontological Resource Management). Condition 1 lands trigger formal analysis of existing data prior to authorizing land-use actions involving surface disturbance. Literature and records review (EVG 2002) documented nine Field Museum (Chicago) localities within a mile of the proposed seismic line.

Management actions for protecting paleontological sites include surface and subsurface stipulations and discretionary management authority. According to the Green River RMP, Monument Valley Management Area lands will be evaluated for paleontology if surface disturbing activities are involved. Based on the paleontology report (EVG 2002), BLM recommends worker education and contingency for discovery of scientifically significant fossils during work. The scientific significance of the locality intercepted by the seismic line is such that the scale of the proposed project would have little effect and no specific mitigation for operating within the locality is recommended (EVG, personal communication, 2/11/02).

Soils

Specific management actions for soil resources in the Green River RMP are designed to reduce soil erosion and sedimentation and salinity contributions to area waters. Management actions include minimizing surface disturbance in areas with highly saline soils. The Green River RMP requires the use of best management practices relative to the Clean Water Act of 1972 to control non-point sources of water pollution. The Green River RMP requires soil management practices to be applied to proposed projects. These practices are related to the steepness of slopes, the length of slopes, and soil chemistry and composition.

Soils in the project area are closely related to the parent bedrock and overall geomorphology. Middle Eocene and Quaternary make up the geologic units in the area and have a distinct impact on the subsequent development of the soils and their distribution. The dominant middle Eocene formation is the Washakie Formation and its associated Adobe Town Member. Textures in this Member are various and range from sandstone, siltstone, mudstone, silty limestone, silty dolomite, tuff and conglomerate.

Soils in the project area formed under a dry, cool climate with spring moisture. They have low organic matter and are formed from residuum on Tertiary bedrock-controlled uplands and in Quaternary alluvium and colluvium along stream and river courses. Residual soils formed from the many types of bedrock exposed at the surface, as well as from wind and flowing water deposits. Principle parent materials of soils in the project area are shales, siltstones, sandstones, and alluvium.

Heavier soils (e.g., silty clay or clay textures) occur in bottom lands and badland breaks and slopes. Stratified sands and gravels are present in river wash associated with streambeds and associated alluvial terraces. Badlands and rock outcrops are formed from mudstone, siltstone, and sandstone of the Adobe Town Member of the Washakie Formation and have little or no soil development due to their predominant erosive feature.

There are two limiting soil factors within the project area: 1) soils on steep slopes and 2) soils with a severe erosion potential.

There is about 130 meters (400 feet) of vertical relief along the proposed seismic line. Elevation

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generally increases in a southwesterly direction from the western tributaries of Sand Creek to the unnamed butte in Sec 1 and 12, T14N, R98W. Minimum elevation is about 6,760 feet in the northeast to about 7,160 feet in the southwest. Slopes within the project area are generally level to undulating (0 to 10 percent) and broken by areas of steeper slopes (10 to 40 percent).

Gentler slopes dominate the northeastern part of the area including the western tributaries of Sand Creek and its associated alluvial terraces. Moderate sloping terraces and rolling, undulating residual upland hills dominate the middle part of the area. Steep slopes are developed primarily along the eastern side of Adobe Rim, a prominent escarpment developed in the Adobe Town Member of the Washakie Formation. Badlands are well developed along the north, east and northeastern side of the rim.

Soil Depth. Soils are deep (>40 inches) on alluvial fans, basins, and valley alluvium. Shallow soils (<20 inches) occur on plains and ravines underlain by sandstone, siltstone, and shale bedrock as well as in areas with steeper topography. Moderately deep soils are those considered between 20 and 40 inches; these soils generally lie on residual upland plains and relatively gentle side slopes.

The majority of the soils within the area have moderate permeability. Areas with sandy soil textures, however, have moderately rapid to rapid permeability. Soils with heavier textures have moderately slow to slow permeability. If compacted, soils become less permeable. Soil crusting also reduces infiltration rates. Most soils in the project area are likely to form a surface crust, particularly if vegetative cover deteriorates.

Bedrock underlying the soils is often fractured, which makes it highly permeable. Soils with a high clay content are subject to cracking upon wetting and drying; tubular cavities can develop as water flows through these cracks. Soils adjacent to major drainages tend to be stratified with repeating layers of finer and coarser soil material which allows for differential lateral flow within these layers.

Soil erodibility due to water and wind varies with soil texture. Silts and silt loams are most susceptible to water erosion. In contrast, fine sands, loamy sands, and coarse sandy loams are most susceptible to wind erosion. Water erosion primarily occurs during spring snow melt and summer thunderstorms that cause intensive runoff and flash flooding. Tributary streams of Sand Creek are moderately incised channels. These channels erode as channel banks cave in and through upstream gully migration. Upland erosion simultaneously occurs due to sheet and rill erosion. The sparse vegetative cover exposes more soil to raindrop impact.

Most areas are undergoing moderate natural rates of erosion. The highest rate of natural, geologic erosion from water occurs in areas with naturally low vegetative cover, soil crusting, low organic matter content, and soft shales. In areas high in sodium where clays have dispersed, overall soil particles are more easily detached by wind and water. Areas with greater amounts of vegetative cover and organic matter content and/or lower sodium content have a lower natural rate of erosion by water. In addition, areas with harder rock fragments associated on or near the surface have less erosion from either water or wind. Areas with unstable soils on the surface or at depth are susceptible to slumping, sliding, and soil creep.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

The proposed project would involve minimal disturbance since shot holes would be drilled with portable drilling equipment placed on skids. Soil disturbance would be restricted to the effects of

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drilling of shot holes. Improperly backfilled shot holes or shotholes in which an underground cavity forms as a result of shot discharge could lead to minor surface subsidence in the immediate area of the shot hole.

The total area affected at each shot hole would be no more than an area about 8 feet by 8 feet and is considered negligible to the geologic and soil environment since only the skids of the portable drill will contact the soil. Given the small, discrete areas of disturbance, natural succession of surrounding native species should be sufficient. No important cumulative impacts on soils and geological resources are expected from project implementation.

The Proposed Action would allow Quantum and their client AEC to gather subsurface information without the expense or potentially unnecessary or undue surface disturbance associated with drilling conventional exploratory oil and gas wells. Should seismic operations indicate a potential for commercially viable hydrocarbons being found, exploratory or development wells could occur. The extent of future development is unknown at this point. Any future proposals for individual exploratory wells and/or development wells would be analyzed at that time.

The Proposed Action could impact scientifically significant vertebrate fossils where they are exposed at the surface. Mitigation measures described in 3.2.3 would serve to reduce potential impacts to paleontologic resources. No important cumulative impacts on paleontologic resources are expected from project implementation.

3.2.2.2 No Action Alternative

Under the No Action Alternative, it could be possible that one or more oil and gas wells would be proposed resulting in associated surface disturbing activities. Implementation of the No Action Alternative would forego the opportunity to use 2-D seismograph to gather comprehensive subsurface data on these pre-FLPMA leases and subsequently pinpoint structures that may contain hydrocarbon pools. Without the 2-D data, the lease holder could end up drilling a "dry-hole" resulting in unnecessary and undue surface disturbance. Should any proposals for individual exploratory wells be proposed, they would be analyzed at that time.

3.2.3 Mitigation Summary

Shot holes should be properly backfilled. They should also be inspected for subsidence in one field season and prior to release of the bond liability.

Mitigation measures for paleontology include (a) worker education of the significance of fossil remains and the restriction on collection of paleontologic resources without a permit and (b) provision for accidental discovery of fossil remains should reduce impacts.

The operator is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating, or removing any vertebrate fossil objects on site. If vertebrate fossil materials are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations are not to resume until written authorization to proceed is issued by the Authorized Officer.

Within five (5) working days, the Authorized Officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant paleontologic resources.

The operator is responsible for the cost of any mitigation required by the Authorized Officer. The

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Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator will be allowed to resume operations.

3.3 WATER RESOURCES

3.3.1 Affected Environment/No Action Alternative

The climate in the project area is semiarid and continental with short, dry summers and long, cold winters. Average annual precipitation probably range between that recorded for Bitter Creek and Baggs, with an average of between 6.72 inches and 11.07 inches, respectively. Thirty-year average records reveal that precipitation is fairly evenly distributed throughout the year with a half inch or less falling on any given day. Peak precipitation months occur during April through June and September through October. Snowfall accumulates on the ground during the winter months but is highly susceptible to redistribution by strong prevailing winds and ablation. Rainfall from cyclonic storms originating in the Pacific Ocean occurs prior to, and after the snowfall season. High intensity, short duration thunderstorms may generate heavy rainfalls from late spring through early fall.

Water resources in the project area include both surface and groundwater and their distribution in the project area are dependent on climate, soils, and structural geology. Surface water is relatively rare or infrequent within the project area which is drained by Sand Creek, a tributary of the Little Snake River. Several unnamed, western tributaries of Sand Creek cross the proposed seismic line. These tributaries, which drain badlands developed east of the Adobe Town Rim are ephemeral (i.e., carry water only in direct response to snow melt and precipitation events). Typically under this regime, streamflow will last for only a short period of time after the runoff-producing event. Flow within the stream channels correlates directly with precipitation; surface runoff occurs during spring and early summer as a result of snowmelt and rainfall. These streams receive little to no support from groundwater discharge to sustain flow; consequently, there are extended periods of time when drainages are dry. A few named and unnamed springs are located at higher elevations near the headwaters of some of the tributaries to Sand Creek, although infiltration and evapotranspiration quickly exceed the discharge rates and intermittent streamflow is sustained only for short distances downstream. Active stream channels in the project area exhibit ephemeral flow only during snowmelt and high-intensity, short-duration summer thunderstorms.

There are no naturally occurring lakes or ponds in the project area and none of the drainages support fisheries. Except for irrigation canals and ditches, as well as ponds constructed away from drainage channels and wetlands, all drainage channels and streams are waters of the U.S. and thus, subject to the requirements of the Federal Clean Water Act (CWA). Activities that involve the discharge pollutants into these waters are regulated by the Environmental Protection Agency (EPA), Army Corps of Engineers (COE), and the Water Quality Division of the Wyoming Department of Environmental Quality (DEQ).

3.3.2 Environmental Consequences

As limited disturbance would occur with project implementation, impacts on surface water resources would be negligible.

Subsurface disturbance is not expected with project implementation except as a result of shot hole drilling to a depth of 80 feet. Interception of groundwater in the Washakie Formation is not anticipated. However, if water is encountered during drilling operations, the appropriate agency

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(State Engineer's Office) would be notified and any water encountered would be isolated (sealed with a bentonite plug). The proposed project would not contribute to the cumulative impact on water resources of other activities in the project area due to the short-term and minimal disturbance associated with the seismic project.

3.3.3 Mitigation Summary

No additional mitigation is needed.

3.4 VEGETATION/INVASIVE PLANTS

3.4.1 Affected Environment/No Action Alternative

Vegetation in the project area is typical of the semi-arid Wyoming Basin floristic region, where precipitation and soil parent material are controlling factors for plant composition. Vegetation often is sparse. Most of the project area is vegetated with a mix of types typical of the basins of south-central Wyoming and are dominated by plant species that are drought tolerant. Wyoming big sagebrush steppe (grassland with a canopy of *Artemisia tridentata* spp. *wyomingensis*) and desert shrub vegetation (a shrub type of shadscale [*Atriplex confertifolia*], greasewood [*Sarcobatus vermiculatus*], and Gardner saltbush [*Atriplex gardneri*] form a mosaic that covers most of the area. Sparsely vegetated rock and soil occur as badlands along Adobe Rim. These areas have a sparse cover of mat saltbush (*Atriplex corrugated*), Indian ricegrass, greasewood, stemless goldenweed (*Haplopappus acaulis*), and foliose lichens.

Stream channels in the project area are ephemeral and do not provide sufficient hydrology for wetlands to develop.

Invasive Plants

Surface disturbing activities associated with shot-hole drilling could allow introduction and/or spreading of invasive plant species into the project area. Weeds compete with native species, rendering an area less productive as a source of forage for livestock and wildlife. Weeds can also reduce the effectiveness of vegetal cover in preventing erosion.

There would be 70 shot points along the line affecting approximately 0.10 acre. The potential for introduction of invasive plants on the estimated 0.10 of short term disturbance associated with the Proposed Action is very low. Due to the limited disturbance (no clearing of vegetation, portable drills on skids, small drill holes) no reclamation is proposed.

3.4.2 Environmental Consequences

As indicated previously, negligible or minor vegetation disturbance is expected with project implementation. Drilling shot holes with portable drill rigs could cause some vegetation crushing and soil disturbance; however, that damage is expected to be minimal.

It is unlikely that plant species of special concern would be adversely impacted by the proposed project since portable drills would be located in areas devoid of or with sparse vegetation in the project area and the minimal disturbance that would result. No cumulative impacts to vegetation resources are expected.

3.4.3 Mitigation Summary

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Since steep slopes (greater than 25%) would be avoided, no additional mitigation is required.

3.5 WILDLIFE

3.5.1 Affected Environment/No Action Alternative

Two big game species occur in the vicinity of the project area: pronghorn antelope and mule deer. The population estimates for big game herds provided below are based upon Wyoming Game and Fish Department (WGFD) models.

3.5.1.1 Big Game

Pronghorn Antelope. Pronghorn in the project area belong to the Bitter Creek herd which occupies an area of approximately 2,915 mi². The entire project area is considered winter/year-long pronghorn range. No crucial pronghorn range occurs within the project area. The nearest crucial pronghorn range is located approximately 6 miles northeast of the project area (WGFD 2001b).

Mule Deer. Mule deer in the project area belong to the Baggs herd (hunt area 100) which occupies approximately 3,440 mi². The entire project area is considered winter/year-long mule deer range. The nearest crucial mule deer range is approximately 4 miles north of the project area.

3.5.1.2 Other Mammals.

Predators known to occur or potentially occurring in the project area are coyote, red fox, ermine, long-tailed weasel, badger, striped skunk, mountain lion, and bobcat (Clark and Stromberg 1987; WGFD 1999). Lagomorph species include desert cottontail, mountain (Nuttall's) cottontail, and white-tailed jackrabbit. Circumstantial evidence of Pygmy rabbits has been documented in the vicinity of the project area (WGFD 1999). Squirrels known to occur or to potentially occur include least chipmunk, Richardson's ground squirrel, thirteen-lined ground squirrel, and white-tailed prairie dog (Clark and Stromberg 1987; WGFD 1999). Other rodents include Wyoming pocket gopher, Wyoming pocket mouse, Ord's kangaroo rat, white-footed deer mouse, northern grasshopper mouse, and sagebrush vole. Several species of shrews (masked, Merriam's and dwarf) and bats (western small-footed, long-legged myotis, Townsend's big-eared) may also occur.

3.5.1.3 Raptors.

Raptor species known to nest in the vicinity of the project area include short-eared owl, American kestrel, prairie falcon, ferruginous hawk, red-tailed hawk, northern harrier, golden eagle, burrowing owl, and great horned owl (Dorn and Dorn 1990, WGFD 1999). Rough-legged hawk may occur in winter or as migrants. One ferruginous hawk and two golden eagle nests are known to occur within 1.0 mile of the proposed project (Figure 3-1), (BLM 2001a). A survey of the known nests along and near the seismic line were conducted by the BLM on April 24, 2002 (Dunder 2002) although the southern eagle nest was not found during the survey. No raptor activity was found within one mile of the proposed seismic line.

3.5.1.4 Upland Game Birds.

The entire project area is contained within the South Wamsutter upland game bird management area, and two upland game bird species--sage grouse and mourning dove--occur in the area (WGFD 1999).

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No known leks have been identified on or within 2.0 miles of the project area; however, sage grouse have been observed near the project area in late summer (WGFD 2002). Suitable nesting, brood-rearing, and wintering habitats are present within and in the vicinity of the area in big sagebrush-dominated habitats.

Mourning dove concentrations are usually highest near power lines, buildings, and other areas of human disturbance, and these habitats are uncommon in the project area. Therefore, doves that do populate the project area likely utilize shrub-covered areas along washes and dunes that provide suitable cover for nesting and roosting.

3.5.1.5 Other Birds.

Passerine bird species potentially occurring within the project area, based upon range and habitat preference, include common nighthawk, Say's phoebe, western kingbird, horned lark, swallows (e.g., violet-green, cliff), black-billed magpie, common raven, American crow, rock wren, mountain bluebird, loggerhead shrike, Brewer's sparrow, vesper sparrow, savannah sparrow, sage sparrow, McCown's longspur, western meadowlark, Brewer's blackbird, common grackle, and brown-headed cowbird (WGFD 1999). Several species of wading/shore birds and waterfowl may occasionally occur around seasonal ponds in the vicinity of the project area. These wading/shore birds include American avocet, willets, killdeer, and spotted sandpiper. Waterfowl species likely to occur include mallard, green-winged teal, northern pintail, blue-winged teal, gadwall, and American wigeon (WGFD 1999).

3.5.1.6 Amphibians and Reptiles

Amphibians are not known to occur in the project area. Reptile species include northern sagebrush lizard, eastern short-horned lizard, northern plateau lizard, Great Basin gopher snake, and prairie rattlesnake (WGFD 1999).

3.5.1.7 Fisheries.

The washes within the project area are ephemeral and do not support permanent fish populations (WGFD 1991), therefore fish are not discussed further in this EA.

3.5.1.8 Threatened, Endangered, Proposed, and Candidate Species (TEP&C)/BLM Sensitive Species

The *Endangered Species Act* (16 U.S.C. 1531-1543) protects listed threatened and endangered plant and animal species and their critical habitats. A list of federally listed TEP&C animal and plant species that potentially occur in the vicinity of the proposed project was compiled from several sources, including a letter from the U.S. Fish and Wildlife Service (USFWS), Wyoming State Supervisor Office (USFWS 2001a), and The Wyoming Natural Diversity Database (WNDD) (WNDD 2002a).

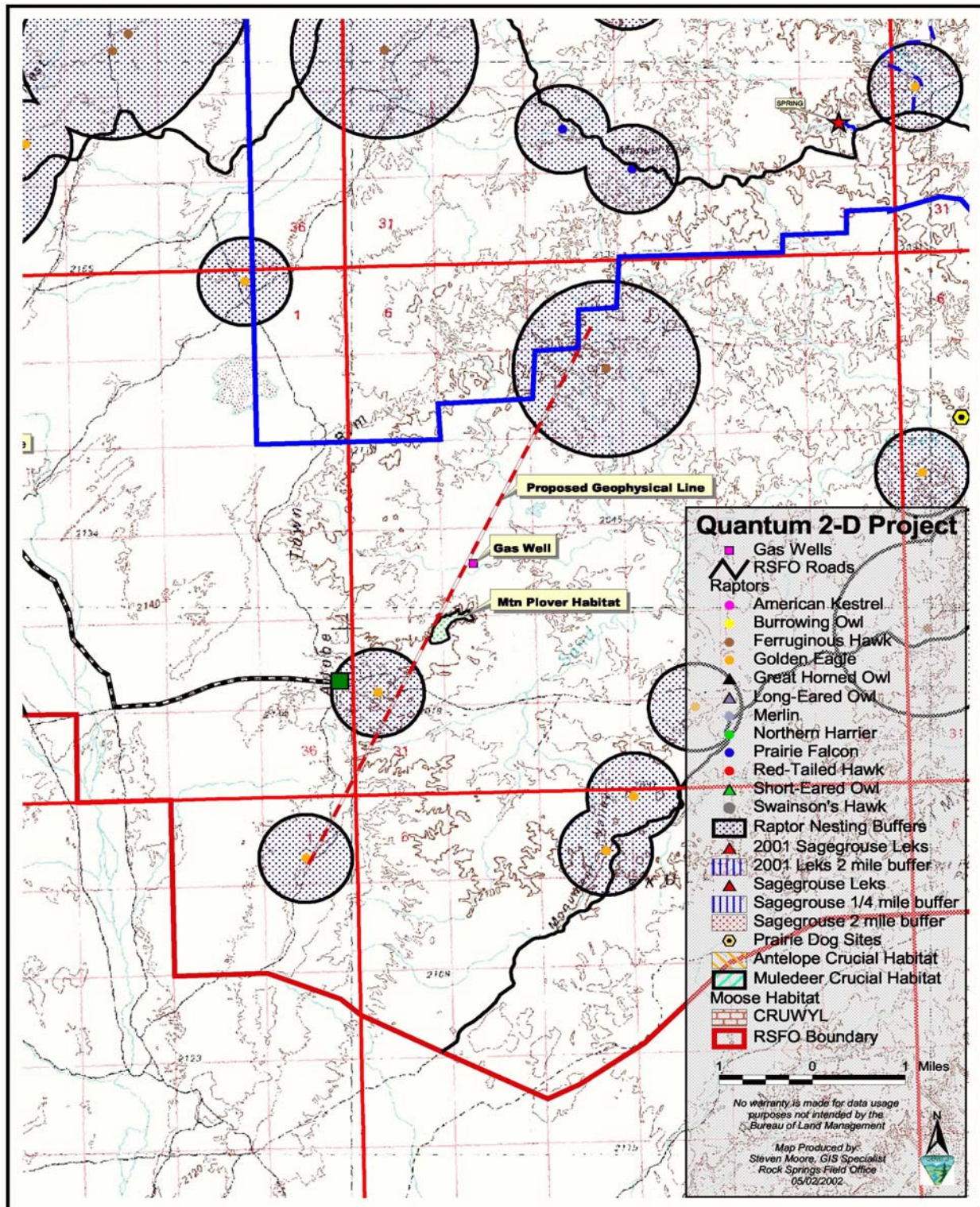


Figure 3-1. Wildlife Map

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TEP&C species are those that have been specifically designated as such by the USFWS. Endangered species are those that are in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Proposed species (proposed for listing as threatened or endangered) are those for which the USFWS has issued proposed rules, but for which a final listing decision has not been made. Candidate species are those for which the USFWS has sufficient data to list as threatened or endangered, but for which proposed rules have not yet been issued. BLM sensitive species are those that may warrant further protection and as such are specifically managed by the BLM.

Threatened and endangered animal species that could occur in the vicinity of the project area include black-footed ferret (*Mustela nigripes*), bald eagle (*Haliaeetus leucocephalus*), and whooping crane (*Grus americana*) (Table 3-3). Mountain plover (*Charadrius montanus*), a species proposed as threatened, also may occur within the project area. The yellow-billed cuckoo is a candidate for listing. The threatened Ute ladies'-tresses (*Spiranthes diluvialis*) is the only federal-listed plant species with the potential to occur within the project area (USFWS 2001).

Table 3-3. Federal Threatened, Endangered, Proposed, and Candidate Species and Their Potential Occurrence on the Quantum Geophysical Adobe Town 2-D Seismic Project Area, Sweetwater County, Wyoming, 2002.¹

Species		Federal Status ²	Potential Occurrence on Project Area ³
Common Name	Scientific Name		
MAMMALS			
Black-footed ferret	<i>Mustela nigripes</i>	E	X
BIRDS			
Bald eagle ⁴	<i>Haliaeetus leucocephalus</i>	T	R
Mountain plover	<i>Charadrius montanus</i>	P	U
Whooping crane	<i>Grus americana</i>	E	X
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	X
FISH			
Bonytail chub	<i>Gila elegans</i>	E	X
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E	X
Humpback chub	<i>Gila cypha</i>	E	X
Razorback sucker	<i>Xyrauchen texanus</i>	E	X
PLANTS			
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	T	X

¹ Adapted from U.S. Fish and Wildlife Service (USFWS) (2001).

² Federal status (USFWS 2001):

E = Federally listed as endangered.

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- T = Federally listed as threatened.
- P = Proposed for federal listing as threatened (64 *Federal Register*, 7587-7601 February 16, 1999).
- C = Candidate species for listing.
- ³ Species occurrence:
 - U = Uncommon; species may be present in the project area, but in such low numbers or in such small and widely scattered populations that an encounter during field development and operation is unlikely. The species could be present for a significant part of the year (e.g., breeding season, summer resident).
 - R = Rare; species may be in the project area for just a few days or hours (e.g., stopping over during migration), or the species has only occasionally or rarely been sighted in the project area. Encounters during field development and operation are very unlikely.
 - X = Unlikely; there has been no recent historical record of the species' occurrence in the project area; probability of encountering the species during field development and operation is very unlikely.
- ⁴ Proposed for removal from federal listing.

Four endangered Colorado River fishes--the bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker --are residents of the Green and Colorado River systems below Flaming Gorge Dam (USFWS 1987; Tyus and Karp 1989; Matthews 1990). Under the *Recovery and Implementation Program for Endangered Fish Species in the Upper Colorado River Basin* (RIP), any water depletions from tributary waters within the Colorado River drainage are considered as jeopardizing the continued existence of these fish. Little water would be required for the proposed project, therefore, no depletion would occur as a result of the Proposed Action. Thus, Colorado River endangered fish species are not discussed further in this EA.

3.5.1.8.1 Threatened Endangered, Proposed & Candidate Species

Black-footed Ferret. The black-footed ferret, a federally endangered species, was once distributed throughout the high plains of the Rocky Mountain and western Great Plains regions (Forrest, et al. 1985). Prairie dogs are the main food of black-footed ferrets (Sheets, et al. 1972), and few black-footed ferrets have been historically collected away from prairie dog towns (Forrest, et al. 1985). The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) defines potential black-footed ferret habitat as any white-tailed prairie dog towns or complexes greater than 200 acres in size with a burrow density of greater than 20 burrows per hectare (8 burrows per acre). No prairie dog towns were found in the area during surveys conducted in December 2001; therefore, no potential black-footed ferret habitat is present along the proposed seismic line (TRC Mariah 2002). The black-footed ferret is not discussed further in this EA.

Bald Eagle. The bald eagle is a federally threatened species (down listed from endangered and now proposed for removal from federal listing) which requires cliffs, large trees, or sheltered canyons associated with concentrated food sources (e.g., fisheries or waterfowl concentration areas) for nesting and/or roosting areas (Edwards 1969; Snow 1973; Call 1978; Steenhof 1978; Peterson 1986). Bald eagles forage over wide areas during the non-nesting season (i.e., fall and winter) and scavenge on animal carcasses such as pronghorn, deer, and elk.

No bald eagle nests or winter roosts are known to occur in the project area--the lack of suitable nesting or winter roosting habitats within the project area precludes its use for such activities by bald eagles. Flaming Gorge Reservoir and the Green River, located over 60 miles west of the project area, provides favorable nesting, roosting, and foraging habitat for bald eagles. Searches of the WNDD revealed no records of bald eagles in the vicinity of the project area (WNDD 2002a);

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therefore, it is unlikely that individuals would be adversely affected by the proposed project, and bald eagle is not discussed further in this EA.

Mountain Plover. The mountain plover is proposed for federal listing as threatened. It inhabits the high, dry short-grass plains east of the Rocky Mountains (Dinsmore 1983), as well as sagebrush grasslands throughout Wyoming (WGFD 1999), and is found in northern Utah and northwestern Colorado (Knopf 1996). Mountain plovers are documented as breeding throughout Wyoming (WGFD 1999). Parrish, et al. (1993) noted that mountain plover nests were found in areas with at least 30% bare ground; vegetation is short (<4 inches) in spaced clumps or mats (e.g., cushion plants) and terrain was relatively flat. Mountain plover breeding/nesting habitat is often associated with active prairie dog towns (USFWS 2001b). In Colorado, the mountain plover diet is composed of 99.7% arthropods, with beetles, grasshoppers, crickets, and ants the most important food items (Baldwin 1971). Breeding bird surveys between 1966 and 1987 show an overall decline in the continental population of mountain plover (U.S. Department of Agriculture, Forest Service [USFS] 1994a, 1994b). Probably the most important reason for the decline of the mountain plover are impacts and habitat alteration on breeding grounds and degradation in the quality of wintering habitats (e.g., southern Texas, California) (Knopf 1994, 1996). Loss of breeding habitat due to cultivation and prey base declines resulting from pesticide use are also threats to mountain plover survival (Wiens and Dyer 1975). Cattle often maintain the open grass habitat favored by mountain plover, so livestock grazing may benefit the species (Klipple and Costello 1960).

A portion of seismic line is composed of saltbush flats that are relatively void of vegetation (TRC Mariah 2002). This vegetation community could provide suitable nesting and foraging habitat for mountain plover. A mountain plover breeding site has been recorded in the vicinity of the project area in 1997 (WNDD 2002a). Mountain plover observations have also been recorded within the Continental Divide Oil and Gas Field located approximately 8 miles north of the project area (BLM 1999). A mountain plover habitat survey was conducted by the BLM on April 29, 2002 (Dunder 2002). No mountain plover were observed during the habitat survey although a small segment of the proposed line skirts the edge of mountain plover habitat (Figure 3-1).

Whooping Crane. A federally endangered species, the whooping crane inhabits moist to wet meadow grasslands, irrigated native and introduced meadows, sedge meadows, and marshes, where it feeds on a variety of plants and animals (WGFD 1999). All WGFD recorded observations of whooping cranes in Wyoming have occurred in the western part of the state, and these birds are probably part of the Gray's Lake fostering project (WGFD 1999). Dorn and Dorn (1990) also report several observations of whooping cranes in eastern Wyoming. Whooping cranes use the Green River as a spring and fall migration corridor; however, no suitable habitat occurs in the project area. No historic or recent observations of whooping cranes are known from the vicinity of the project area (WNDD 2002a), and the likelihood of their presence in the area is extremely low; therefore, the whooping crane is not discussed further in this EA.

Yellow-billed cuckoo. In Wyoming, the yellow-billed cuckoo is a rare summer breeder that arrives from wintering grounds in South America in late May, and departs from September to October. The yellow-billed cuckoo is primarily found in open, streamside deciduous woodland with low, scrubby vegetation undergrowth bordering Wyoming's larger rivers. Cottonwood stands and willow thickets are preferred for nesting and foraging (WNDD 2002b). The yellow-billed cuckoo has been identified as potentially occurring in the riparian areas west of the Continental Divide (USFWS 2001a); however, it is highly unlikely that the yellow-billed cuckoo occurs in the project area, since no riparian habitat is present and no observations have been recorded in the vicinity (WNDD 2002a). The nearest potential yellow-billed cuckoo habitat is likely located along the Green River located

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over 60 miles west of the project area. Therefore, the yellow-billed cuckoo is not discussed further in this EA.

Ute Ladies'-Tresses. Ute ladies'-tresses, a federally threatened species, is a perennial member of the orchid family which inhabits moist streambanks, wet meadows, and abandoned stream channels at elevations of 4,500-6,800 feet (Fertig 1994; Spackman, et al. 1997). Where it occurs in ephemeral drainages, ground water is typically shallow (i.e., within approximately 18 inches of the ground surface) (personal communication, March 16, 2000, with Pat Deibert, USFWS; personal communication, March 22, 2000, with Walt Fertig, WNDD). No suitable Ute Ladies'-tresses habitat occurs within the project area, and the likelihood of their presence in the area is extremely low. Therefore, Ute ladies'-tresses are not discussed further in this EA.

3.5.1.8.2 BLM-Sensitive Species

Based on habitat preference and geographic location, numerous BLM-sensitive species occur or potentially occur in the project area (BLM 2001b)(Table 3-4). The burrowing owl, Payson's tansymustard, and many-headed broom groundsel have been recorded in the vicinity of the project area (WNDD 2002a).

Table 3-4. BLM Sensitive Species Potentially Occurring in the Vicinity of the Quantum Geophysical Adobe Town 2-D Seismic Project Area, Sweetwater County, Wyoming, 2002.¹

Species Common Name	Scientific Name	Habitat
MAMMALS		
Dwarf Shrew	<i>Sorex nanus</i>	Mountain foothill shrub, grasslands
Spotted Bat	<i>Euderma maculatum</i>	Cliffs over perennial water, basin-prairie shrub
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	Forests, basin-prairie shrub, caves and mines
Pygmy Rabbit	<i>Brachylagus idahoensis</i>	Basin-prairie and riparian shrub
White-tailed Prairie Dog	<i>Cynomys leucurus</i>	Basin-prairie shrub, grasslands
Wyoming Pocket Gopher	<i>Thomomys clusius</i>	Meadows with loose soil
Idaho Pocket Gopher	<i>Thomomys idahoensis</i>	Shallow stony soils
Swift Fox	<i>Vulpes velox</i>	Grasslands
BIRDS		
Ferruginous Hawk	<i>Buteo regalis</i>	Basin-prairie shrub, grassland, rock outcrops
Peregrine Falcon	<i>Falco peregrinus</i>	Tall cliffs
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	Basin-prairie shrub, mountain-foothill shrub
Burrowing Owl	<i>Athene cunicularia</i>	Grasslands, basin-prairie shrub

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Species Common Name	Scientific Name	Habitat
Sage Thrasher	<i>Oreoscoptes montanus</i>	Basin-prairie shrub, mountain-foothill shrub
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Basin-prairie shrub, mountain-foothill shrub
Brewer's Sparrow	<i>Spizella breweri</i>	Basin-prairie shrub
Sage Sparrow	<i>Amphispiza billineata</i>	Basin-prairie shrub, mountain-foothill shrub
Baird's Sparrow	<i>Ammodramus bairdii</i>	Grasslands, weedy fields
REPTILES		
Midget Faded Rattlesnake ²	<i>Crotalus viridis concolor</i>	Mountain foothills shrub, rock outcrop
PLANTS		
Mystery Wormwood	<i>Artemisia biennis var. diffusa</i>	Clay flats & playas 6,500'
Nelson's Milkvetch	<i>Astragalus nelsonianus-or- Astragalus pectinatus var. platyphyllus</i>	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, & cushion plant communities at 5200-7600'
Precocious Milkvetch	<i>Astragalus proimanthus</i>	Cushion plant communities on rocky, clay soils mixed with shale on summits & slopes of white shale hills 6,800-7,200'
Cedar Rim Thistle	<i>Cirsium aridum</i>	Barren, chalky hills, gravelly slopes, & fine textured, sandy-shale draws 6,700-7,200'
Ownbey's Thistle	<i>Cirsium ownbeyi</i>	Sparsely vegetated shaley slopes in sage & juniper communities 6,440-8,400'
Large-fruited Bladderpod	<i>Lesquerella macrocarpa</i>	Gypsum-clay hills & benches, clay flats, & barren hills 7,200-7,700'
Stemless Beardtongue	<i>Penstemon acaulis var. acaulis</i>	Cushion plant or Black sage grassland communities on semi-barren rocky ridges, knolls, & slopes at 5,900-8,200'
Beaver Rim Phlox	<i>Phlox pungens</i>	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400'
Tufted Twinpod	<i>Physaria condensata</i>	Sparsely vegetated shale slopes & ridges 6,500-7,000'
Green River Greenthread	<i>Thelesperma caespitosum</i>	White shale slopes & ridges of Green River Formation 6,300'

¹ Adapted from BLM 2001b.

3.5.2 Environmental Consequences

² *Crotalus viridis concolor* has not been documented to occur in the project area. Range of this species is not known to overlap with the prairie rattlesnake, *Crotalus viridis viridis* which is found throughout the Washakie Basin.

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Impacts to wildlife could result from displacement of wildlife due to disturbance by project-related activities (helicopters, drilling, traffic, etc.) and an increased potential for vehicle/animal collisions due to increased traffic during seismic operations. No shot holes would be allowed on areas having burrows so no impact to burrows is expected (discharging the explosives do not cause collapse of burrows).

3.5.2.1 Big Game

Under the Proposed Action, vegetation could be disturbed on approximately 0.10 acre of pronghorn and mule deer winter/year-long range due to the drilling of 70 shot points. The 70, 3.5-inch drill holes would be scattered along a 5.90-mile line (on lease only) in small 8-foot by 8-foot parcels. All other projected-related disturbances such as helicopter landing areas, and staging areas for the deployment of equipment would occur on private property or existing roads.

Applicant-committed practices to minimize impacts to big game from loss of vegetative cover include minimization of vegetation disturbance to the extent possible by locating drilling equipment on areas devoid of or with sparse vegetation, vehicular use of existing roads, the use of helicopters to deploy seismic lines, and the use of foot travel for all project-related activities within the Adobe Town WSA. Therefore impacts to big game habitat are not expected to be significant.

Disturbance from helicopters, trucks, project-related activities (i.e., seismic testing), and human presence could affect utilization of habitats immediately adjacent to these areas. Some short-term pronghorn displacement may occur. Impacts to mule deer would be similar to those of pronghorn. The highest levels of displacement would likely occur during the delivery of the seismic lines by helicopters and the drilling of the shot holes when human activity occurs at its highest levels. Based on studies (Gusey 1986; Guenzel 1986, and Easterly, et al. 1991), any displacement likely would be about 0.5 miles; however, since the project is expected to take no more than 7 days where no crucial big game range occurs in the immediate vicinity, disturbance to big game by displacement is not significant.

Increased mortality from vehicle/animal collisions is a potential but an unlikely impact that could occur. However, vehicular travel within the Adobe Town WSA would occur only along existing roads and for only a short period of time; therefore, increased mortality from vehicle/animal collisions as a result of the proposed project is not anticipated to be significant.

3.5.2.2 Other Mammals

Direct impacts to other mammals would include disruption during project activities and possible vehicle/animal collisions. Most small mammal species are relatively tolerant of human activity (they abandon the area). Total project-required disturbance would be 0.10 acre and this disturbance would be short term. Any disturbance would occur in small areas over a dispersed area; therefore, impacts to mammal habitat (through displacement) are not anticipated to be significant. Project impacts to small mammals would likely be masked by natural variations in populations due to weather, disease, and other natural factors. Vehicular travel would be limited to existing roads and occur over a short period; therefore, any potential mortality from vehicle/animal collisions is not anticipated to be significant.

3.5.2.3 Raptors

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Factors potentially resulting in decreased raptor reproductive success from the presence of increased human activities in the area include nest and/or area abandonment, damage to eggs or young from frightened adults, overexposure of eggs or young to heat or cold, missed feedings, premature fledging, and increased predation. The potential for these impacts would be greatest if project-related activities (heliport, project-set up, increased human presence) would occur during the raptor nesting and/or rearing season and in the vicinity of occupied raptor nests. Raptor surveys of the project area and 1.0-mile buffer have been completed prior to operations. No raptor activity was observed and raptor clearance has been recommended by the BLM.

Reduction in raptor prey species would be minimized by holding disturbance to minimum levels. Project-related activities would affect approximately 0.10 acre and occur over a short period of time; therefore, no reduction in prey species is expected and is not anticipated to significantly impact raptors.

3.5.2.4 Game Birds

No sage grouse leks are known to occur within 2.0 miles of the project area; therefore project activities are not anticipated to impact breeding and/or nesting sage grouse.

Mourning doves would not be significantly impacted by the proposed project because of the project timing, the low level of habitat disturbance, the inherent mobility of the species, and the availability of suitable habitats on nearby undisturbed lands.

3.5.2.5 Other Birds

Nongame birds could be adversely affected by increased human activity in the project area; however, impacts would occur primarily in direct proportion to the amount of a species' habitat that would be affected. Since surface disturbance would be scattered in small parcels (0.10 acre total) along a 5.90 mile linear distance (on lease only) and these disturbances would be short term, impacts are anticipated to be less than significant.

3.5.2.6 Amphibians and Reptiles

Direct impacts to reptiles likely would occur in direct proportion to the amount of their habitat disturbed. Since disturbance would be scattered in small parcels (0.10 acres total) along the 5.90 mi-linear distance, and all disturbance would be short-term, no significant impacts are anticipated.

3.5.2.7 Threatened, Endangered, Proposed, and Candidate Species

The temporary loss of potential mountain plover breeding and foraging habitat due to proposed project activities is unlikely to adversely affect breeding plover or jeopardize individuals. A mountain plover habitat survey has been completed by the BLM. No mountain plover were observed during the survey conducted on April 29, 2002. A mountain plover clearance would be conducted in accordance with U.S. Fish and Wildlife survey guidelines (March 2002) as proposed.

3.5.3 Mitigation Summary

In order to minimize impacts to big game winter/yearlong range, patches of tall sagebrush should be avoided by seismic operations where practical.

3.6 NOISE

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3.6.1 Affected Environment/ No Action Alternative

The major sources of noise within the project area are occasional jet aircraft traffic overflights at high altitudes and localized vehicular and light industry activity on local resource roads within the project area. These noise sources currently create only modest sound disturbances within the area.

3.6.2 Environmental Consequences

Seismic-related activities, including portable drill rigs and support vehicles, helicopters and helicopter support traffic, and actual shot hole drilling and shooting operations would create sound disturbance within the project area. These impacts would be short-lived and at a time when few people are using the area, lasting only as long as the project is ongoing (7 days). No long-term noise related impacts would result from the seismic operations.

3.6.3 Mitigation Summary

Given the type of seismic operation and the remote location of seismic operations, no additional measures are needed to mitigate project-generated noise.

3.7 WILDERNESS/VISUAL RESOURCES/RECREATION

3.7.1 Affected Environment

The Adobe Town WSA is located approximately 25 miles south of Wamsutter and contains 82,350 acres of public land managed by BLM, 3,360 acres of split estate land (BLM surface), and 1,280 acres of State of Wyoming land. The WSA is bounded on the north by checkerboard lands and the Manual Gap Road, on the west by the Adobe Town Rim road, the south by the Shell Creek road, and on the east by the Willow Creek road. These roads are lightly traveled; most motorists are local ranchers, oil/natural gas field personnel, or a limited number of hunters that use these roads during the upland bird and big game seasons. Due to the remote location, visitor use is likely to be fairly low. One oil/gas well is located in Section 2, T. 15 N., R. 96 W. (outside of the project area), and has been plugged. Two other wells, one located in Section 20, T. 15 N., R. 97 W., and one located in Section 30, T. 15 N., R. 97 W., are within the three pre-FLPMA leases affected by the seismic project but have been plugged and abandoned.

The BLM has evaluated the visual resources of the project area using the BLM Visual Resource Management (VRM) System. According to the Green River RMP, lands within the Adobe Town WSA were classified as Class II. Washington Office Instruction Memorandum (WO-IM-2000-096) directs BLM to manage viewsheds within WSAs as Class I. VRM management objective for Class I areas, with the exception of grandfathered rights, is to preserve the existing character of the landscape. This class provides for the natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

The project area is not visible from any major viewing points such as highways, cities, or recreation areas.

There are no developed recreation facilities within the project area. Known levels of recreation activity within the project area and adjacent lands are low and occur predominantly during the fall hunting seasons. The project area is within Antelope Hunting Area 57, and Mule Deer Hunting

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Area 100. The 2001 mule deer hunting season ran from September 15 through September 30. The 2001 antelope season ran from October 15 through October 31.

3.7.2.1 Environmental Consequences of the Proposed Action

Short-term impacts to visual resources would occur where seismic equipment is visually evident to casual observers.

Past disturbance to the visual resources in the immediate area have been low in scale. Roads, drill sites, and other activities have introduced a human-natural mix into the characteristic landscape. Consequently, the impact of the proposed 2D seismic program on the visual resource would not be substantial in the short term. There would be no long-term impacts to the visual resource following completion of seismic operations and removal of equipment. Some minor trampling of vegetation could result.

Short-term impacts to the recreation resource would occur where seismic related activities disrupt the quality of dispersed recreation activities should such activities take place when seismic operations are occurring. Due to the timing of this operation, it is unlikely that recreationists would be impacted. No long-term impacts to recreation would occur following completion of the seismic project.

Should seismic operations indicate a potential for commercially viable hydrocarbons, future exploratory or development wells could be proposed on these leases within the Adobe Town WSA. The extent of future development is unknown at this point. Any future proposals for individual exploratory wells and/or development wells would be analyzed at the time.

3.7.2.2 Environmental Consequences of the No Action Alternative

Implementation of the No Action Alternative would forego the opportunity to use 2-D seismograph to gather comprehensive subsurface data on the three pre-FLPMA leases resulting in possible unnecessary and undue surface disturbance within the Adobe Town WSA should one or more “dry-holes” be drilled. Any proposals for individual exploratory wells would be analyzed at the time.

3.7.3 Mitigation Summary

No additional mitigation is proposed.

3.8 SOCIOECONOMIC CONSIDERATIONS

3.8.1 Affected Environment/No Action Alternative

The Adobe Town Rim Prospect 2-D seismic project is located in the northwest portion of the Washakie Basin southeast of Rock Springs, Wyoming, in the south-central portion of Sweetwater County. This region of Wyoming is located in the south-central portion of the Wyoming Basin physiographic province as defined by Fenneman (1931). Specifically, it is about 31 miles (50 km) south of Bitter Creek, Wyoming.

The economic base within Sweetwater County is primarily dependent on oil and gas and mining.

Peak workforce at any one time for the project is expected to be approximately 15 workers. Total time to complete the project is estimated at 7 days. Quantum would be conducting the seismic

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operations on the Adobe Town 2D seismic project. Seismic crews would be headquartered in Rock Springs, Wyoming, due to availability of short-term housing and other basic services. Crews would be transported to the project area and back to Rock Springs on a daily basis. Crews would not be kept on-site at the project area.

3.8.2 Environmental Consequences

The range of possible impacts is broad, including short-term increases in economic activity for those businesses capable of providing support goods and services (motels, restaurants, stores, etc.), primarily in the Rock Springs area. For the most part, however, it appears unlikely that the project as currently proposed would alter area social or economic conditions from their current status. Also, it is unlikely that the project would cause disruption of ranching operations and the lifestyles of ranch operators and their families who work in the immediate vicinity of the seismic project. This is primarily due to the short duration of the project (7 days) and the relatively small work force anticipated (approximately 15 people).

Quantum maintains full-time experienced crews. As a result, employment opportunities for the local population is not likely. The number of workers likely to migrate into the area to work on the project is sufficiently small so as to preclude any significant economic or social disruptions of the types that have occurred in communities affected by energy-related boom growth. Rock Springs and other area communities have sufficient infrastructure to accommodate substantially more growth than is likely to be stimulated by this project.

It is very unlikely that proposed project activities would generate significant levels of concern, opposition, or dissatisfaction among the general population of area communities. Residents of area communities are accustomed to and generally accepting of oil and gas related activities, including seismic operations, and are unlikely to view this project as problematic, particularly since it is located adjacent to areas where previous oil and gas related activities have occurred.

In addition, project-related expenditures and income associated with project employment would also generate monetary inflows to the area economy.

3.8.3 Mitigation Summary

No additional mitigation is required.

3.9 CULTURAL/HISTORICAL RESOURCES

3.9.1 Affected Environment/No Action Alternative

Class I file searches were conducted on October 2 (Nos. 4748 and 4749) and November 15 (No. 5244), 2001, through the Cultural Records Office of the Wyoming State Historic Preservation Office (SHPO) for Sections 4, 8, 9, 17, 19, 20, 30, and 31, T15N, R97W; Section 36, T15N, R98W; and Section 1, T14N, R98W. The file searches indicate that 13 projects have been conducted within the sections crossed by the Adobe Town Rim Prospect 2-D seismic project. Of these, five were linear surveys completed for access roads, four were block surveys for well pads, two were linear surveys for pipelines, one was a linear survey for a seismic line, and one was a linear sampling survey for a miscellaneous project.

A total of 30 sites were identified by the 13 previous projects conducted in the sections crossed by the current project. These sites include eight NRHP-eligible sites, five NRHP-ineligible sites, and

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17 sites that are unevaluated with respect to the NRHP. All 30 sites are prehistoric and comprise 17 open camps, nine lithic scatters, two lithic scatters with groundstone, one lithic scatter with ceramics, and one lithic scatter with a cairn. None of the previously recorded sites occur within the inventoried project area. However, one site does occur along the receiver line, but because it is located outside of a source point location, it will not be impacted by the project.

A Class III inventory indicated that four historic properties are within or near the path of the receiver points. Shot points locations were altered to avoid the three sites along the seismic line.

3.9.2 Environmental Consequences

Conducting the proposed seismic program could cause impacts to sites determined to be eligible for nomination to the National Register of Historic Places (NRHP). However, given the modification of locating shot points to avoid the three sites along the line, no direct impacts to cultural resources are expected. Indirect or cumulative impacts are not expected since no vehicles would be allowed off existing roads and collecting of artifacts is prohibited.

3.9.3 Mitigation Summary

Impacts to cultural/historical resources within the project area would be alleviated by avoidance of the site. No additional mitigation is identified.

3.10 Adobe Town Wild Horse Herd Management Area

The proposed action would occur in the Adobe Town Wild Horse Herd Management Area. Gathering of excess wild horses is scheduled for mid-July 2002. Since seismic operations affect only a small portion of the herd management area and the fact that wild horses are very tolerant of human activity (there could be short duration displacement if they are in the vicinity of the operations), wild horses are not expected to be affected or impacted by seismic activity. Wild horses will not be discussed further.

3.11 SUMMARY OF CUMULATIVE EFFECTS

Cumulative effects may occur due to the Proposed Action in combination with other ongoing activities, recently constructed projects, and projects likely to be implemented in the near future. Cumulative effects are both additive and interactive. Chapter 3 discusses these effects under each resource discipline section (Environmental Consequences).

The following is a summary discussion of cumulative effects likely to occur with implementation of the Adobe Town 2D seismic project in combination with other ongoing activities within or adjacent to the seismic project area.

There is one proposed activity in the immediate vicinity of the Adobe Town 2D seismic project, which is the Skull-Creek 2D seismic project. This project has not yet been approved by the BLM. Grazing can occur year-round but is dependent on the availability of water. No other activities are known to occur.

No cumulative impacts are expected to result from project-related activities for the following reasons:

- Project impacts as described in this EA for the Proposed Action are temporary in nature,

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involving minimal site disturbance;

- No cumulative impacts to big game are anticipated from the proposed project because no crucial big game range would be disturbed and all impacts would be of short duration (7 days). In addition, no cumulative impacts to other mammals, birds, reptiles, and amphibians are anticipated from the proposed project because a relatively small area (0.10 acre) would be disturbed and all of the disturbance would be short term. While the total extent of sage grouse habitat along the proposed seismic route has not been defined, only limited and scattered habitat disturbance (i.e., 0.10 acre along a 5.90-mile linear distance located on lease) would occur, a pre-disturbance survey for wintering grouse would be implemented, and appropriate BLM-identified mitigation/avoidance measures would be applied if wintering grouse are found; therefore, no notable cumulative impacts to sage grouse are anticipated. No cumulative impacts to raptor species are anticipated as a result of the proposed project since the project would occur outside the actual raptor nesting season for the species potentially affected and appropriate surveys and avoidance/impact minimization measures would be applied in the event nesting raptors are found in the area.

Therefore, the proposed Adobe Town 2D seismic project as described in this EA (the Proposed Action) together with other federal actions and local commercial and recreational activities would not appreciably affect critical elements of the human environment.